

基于方位非线性变标的弹载SAR下降段成像算法

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An Imaging Algorithm for Missile-borne SAR with Downward Movement Based on Azimuth Nonlinear Chirp Scaling

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摘要

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摘要 俯冲下降阶段, 弹体自身较大的俯冲下降速度和加速度导致SAR回波信号方位不变性的假设不再成立, 给SAR成像处理带来困难。针对该问题, 该文提出了一种基于方位非线性变标的弹载SAR下降段成像算法。结合级数反演, 在2维频域完成距离徙动校正和距离脉冲压缩之后, 通过方位向上的非线性变标操作, 补偿空变的多普勒调频率, 从而较为有效地改善了方位聚焦深度和聚焦质量。数据仿真验证了算法的有效性。

关键词: 弹载SAR 级数反演 非线性变标

Abstract: During the downward movement for missile-borne SAR, the assumption that echo signal invariance in azimuth is not accurate, which is caused by high vertical velocity and acceleration, making SAR imaging difficult to process. Due to this reason above, by using azimuth NonLinear Chirp Scaling (NLCS), an imaging algorithm for missile-borne SAR is proposed in this paper. After range cell migration correction and range compression in the 2-D frequency domain, via the Method of Series Reversion (MSR), azimuth variation of Doppler FM rates for echo signal can be compensated with the operation of azimuth nonlinear chirp scaling, which effectively improves focusing depth and focusing effect. Simulation results are provided to validate the effectiveness of the proposed algorithm.

Keywords: Missile-borne SAR Method of Series Reversion (MSR) NonLinear Chirp Scaling (NLCS)

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